5.11 Hydrology and Water Quality

5.11 HYDROLOGY AND WATER QUALITY

This section analyzes potential project impacts on existing drainage patterns, surface hydrology, and flood control facilities and water quality conditions in the project area. Mitigation measures are recommended to avoid potential impacts or reduce them to a less than significant level. The discussion in this section is based on information and conclusions contained in the following studies:

- *Department of Water and Power Specific Plan Amendment Environmental Impact Report Hydrology and Water Quality Technical Appendix* (Hydrology Study), prepared by RBF Consulting, dated November 2011; refer to Appendix 11.10, *Hydrology and Water Quality Technical Study*.
- *Preliminary Water Quality Management Plan* (Preliminary WQMP), prepared by Fuscoe Engineering, dated November 1, 2011; refer to Appendix 11.10, *Hydrology and Water Quality Technical Study*.
- Santa Ana Regional Water Quality Control Board, *Water Quality Control Plan*, updated 2008.
- *City of Seal Beach Master Plan of Drainage Update*, prepared by AKM Consulting Engineers, updated August 2008.

5.11.1 EXISTING SETTING

EXISTING PROJECT SITE HYDROLOGY AND DRAINAGE CONDITIONS

The project site is located at the downstream portion of the San Gabriel River Watershed. The San Gabriel River Watershed encompasses approximately 640 square miles and drains into the San Gabriel River from the San Gabriel Mountains. Major tributaries to the San Gabriel River include Walnut Creek, San Jose Creek, and Coyote Creek.

Storm water runoff from the northern portion of the project site is conveyed via surface flows to Los Angeles County Flood Control District (LACFCD) inlet structures; refer to Exhibit 5.11-1, *Existing Drainage Conditions*. Flow is conveyed from the inlet structures through 24-inch Reinforced Concrete Pipe (RCP) to outlet structures on the east bank of the San Gabriel River. Flow proceeds southwesterly in the San Gabriel River to the Pacific Ocean, approximately 2,400 feet to the southwest of the project site. Some on-site flow is directed to the streets to an existing catch basin on the westerly corner of 1st Street and Marina Drive where there has been a history of flooding. This catch basin is connected directly to the San Gabriel River via a 24-inch connecting pipe. This storm drain facility is identified as SG1 on the City's Master Plan of Drainage.

Table 5.11-1, *Existing Flowrates (Northern Site)*, provides a summary of existing conditions for 2-year and 25-year storm event runoff for the northern portion of the project site. The southern portion of the project site is not part of the City's Master Plan of Drainage. The existing topography indicates that runoff in the southern portion of the project site predominantly sheet flows either in the northwest or southwest direction. The run-off flows to the northwest enter an existing pipe and outlets into the San Gabriel River, which flows west to the Pacific Ocean. A detailed analysis of existing flowrates was not conducted for the southern portion of the site, as the proposed land uses for the southerly area do not vary significantly between existing and proposed conditions.

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ENVIRONMENTAL IMPACT REPORT
DEPARTMENT OF WATER AND POWER SPECIFIC PLAN AMENDMENT

Existing Drainage Conditions

Exhibit 5.11-1

Table 5.11-1
Existing Flowrates (Northern Site)

Area ID	Node	Area (Acres)	Flow (cfs)	Notes
2-Year Flowrates				
A and C	306	4.5	4.4	Tributary to the Marina Drive storm drain.
B	203	2.2	2.3	Directly tributary San Gabriel River.
Total	-	6.7	6.7	Total Pre-project Volume = 0.18 ac-ft
25-Year Flowrates				
A and C	104 & 306	4.5	10.5	Tributary to the Marina Drive storm drain.
B	204	2.2	5.7	Directly tributary San Gabriel River.
Total	-	6.7	16.2	Total Summed Site Runoff

Source: RBF Consulting, *Department of Water and Power Specific Plan Amendment Environmental Impact Report Hydrology and Water Quality Technical Appendix*, November 2011.

FLOODPLAIN MAPPING

The City of Seal Beach is a participant in the National Flood Insurance Program (NFIP). Communities participating in the NFIP must adopt and enforce minimum floodplain management standards, including identification of flood hazards and flooding risks. Participation in the NFIP allows communities to purchase low cost insurance protection against losses from flooding. The project site can be found on published Flood Insurance Rate Map (FIRM) Number 06059C0226J, dated December 3, 2009 and is located in Zone X, which is defined as areas protected by levees from the one percent annual flood; refer to Figure 5, *Existing FEMA Firm*, of the Hydrology Study (as provided in Appendix 11.10).

EXISTING STORM WATER QUALITY CONDITIONS

Nonpoint Source Pollutants

A net effect of urbanization can be to increase pollutant export over naturally occurring conditions. The impact of the higher export affects the adjacent streams and also the downstream receiving waters. However, an important consideration in evaluating storm water quality is to assess whether the beneficial use to the receiving waters is impaired. Nonpoint source pollutants have been characterized by the following major categories in order to assist in determining the pertinent data and its use. Receiving waters can assimilate a limited quantity of various constituent elements; however, there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable impact. Standard water quality categories of typical urbanization impacts are:

- *Sediment*. Sediment is made up of tiny soil particles that are washed or blown into surface waters. It is the major pollutant by volume in surface water. Suspended soil particles can cause the water to look cloudy or turbid. The fine sediment particles also act as a vehicle to transport other pollutants, including nutrients, trace metals, and hydrocarbons. Construction sites are the largest source of sediment for urban areas under development. Another major source of sediment is streambank erosion, which may be accelerated by increases in peak rates and volumes of run-off due to urbanization.

- *Nutrients*. Nutrients are a major concern for surface water quality, especially phosphorous and nitrogen, which can cause algal blooms and excessive vegetative growth. Of the two, phosphorus is usually the limiting nutrient that controls the growth of algae in lakes. The orthophosphorous form of phosphorus is readily available for plant growth. The ammonium form of nitrogen can also have severe effects on surface water quality. The ammonium is converted to nitrate and nitrite forms of nitrogen in a process called nitrification. This process consumes large amounts of oxygen, which can impair the dissolved oxygen levels in water. The nitrate form of nitrogen is very soluble and is found naturally at low levels in water. When nitrogen fertilizer is applied to lawns or other areas in excess of plant needs, nitrates can leach below the root zone, eventually reaching ground water. Orthophosphate from auto emissions also contributes phosphorus in areas with heavy automobile traffic. As a general rule of thumb, nutrient export is greatest from development sites with the most impervious areas. Other problems resulting from excess nutrients are: 1) surface algal scums; 2) water discolorations; 3) odors; 4) toxic releases; and 5) overgrowth of plants. Common measures for nutrients are total nitrogen, organic nitrogen, total Kjeldahl nitrogen (TKN), nitrate, ammonia, total phosphate, and total organic carbon (TOC).

- *Trace Metals*. Trace metals are primarily a concern because of their toxic effects on aquatic life, and their potential to contaminate drinking water supplies. The most common trace metals found in urban run-off are lead, zinc, and copper. Fallout from automobile emissions is also a major source of lead in urban areas. A large fraction of the trace metals in urban run-off are attached to sediment; this effectively reduces the level, which is immediately available for biological uptake and subsequent bioaccumulation. Metals associated with sediment settle out rapidly and accumulate in the soils. Urban run-off events typically occur over a shorter duration, reducing the amount of exposure, which could be toxic to the aquatic environment. The toxicity of trace metals in run-off varies with the hardness of the receiving water. As total hardness of the water increases, the threshold concentration levels for adverse effects increases.

- *Oxygen-Demanding Substances*. Aquatic life is dependent on the dissolved oxygen in the water. When organic matter is consumed by microorganisms, dissolved oxygen is consumed in the process. A rainfall event can deposit large quantities of oxygen-demanding substance in lakes and streams. The biochemical oxygen demand of typical urban run-off is on the same order of magnitude as the effluent from an effective secondary wastewater treatment plant. A problem from low dissolved oxygen (DO) results when the rate of oxygen-demanding material exceeds the rate of replenishment. Oxygen demand is estimated by direct measure of DO and indirect measures such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), oils and greases, and TOC.

- *Bacteria*. Bacteria levels in undiluted urban run-off exceed public health standards for water contact recreation almost without exception. Studies have found that total coliform counts exceeded the U.S. Environmental Protection Agency's (EPA) water quality criteria at almost every site and almost every time it rained. The coliform bacteria that are detected may not be a health risk by themselves, but are often associated with human pathogens.

- *Oil and Grease*. Oil and grease contain a wide variety of hydrocarbons, some of which could be toxic to aquatic life in low concentrations. These materials initially float on water and create the familiar rainbow-colored film. Hydrocarbons have a strong affinity for sediment and quickly become absorbed to it. The major source of hydrocarbons in urban run-off is through leakage of crankcase oil and other lubricating agents from automobiles. Hydrocarbon levels are highest in the run-off from parking lots, roads, and service stations. Residential land uses generate less hydrocarbon export, although illegal disposal of waste oil into storm water can be a local problem.

- *Other Toxic Chemicals*. Priority pollutants are generally related to hazardous wastes or toxic chemicals and can be sometimes detected in storm water. Priority pollutant scans have been conducted in previous studies of urban run-off, which evaluated the presence of over 120 toxic chemicals and compounds. The scans rarely revealed toxins that exceeded the current safety criteria. The urban run-off scans were primarily conducted in suburban areas not expected to have many sources of toxic pollutants (with the possible exception of illegally disposed or applied household hazardous wastes). Measures of priority pollutants in storm water include: 1) phthalate (plasticizer compound); 2) phenols and creosols (wood preservatives); 3) pesticides and herbicides; 4) oils and greases; and 5) metals.

PHYSICAL CHARACTERISTICS OF SURFACE WATER QUALITY

Standard parameters, which can assess the quality of storm water, provide a method of measuring impairment. A background of these typical characteristics assists in understanding water quality requirements. The quantity of a material in the environment and its characteristics determine the degree of availability as a pollutant in surface run-off. In an urban environment, the quantity of certain pollutants in the environment is a function of the intensity of the land use. For instance, a high density of automobile traffic makes a number of potential pollutants (such as lead and hydrocarbons) more available. The availability of a material, such as a fertilizer, is a function of the quantity and the manner in which it is applied. Applying fertilizer in quantities that exceed plant needs leaves the excess nutrients available for loss to surface or ground water.

The physical properties and chemical constituents of water traditionally have served as the primary means for monitoring and evaluating water quality. Evaluating the condition of water through a water quality standard refers to its physical, chemical, or biological characteristics. Water quality parameters for storm water comprise a long list and are classified in many ways. Typically, the concentration of an urban pollutant, rather than the annual load of that pollutant, is required to assess a water quality problem. Some of the physical, chemical, or biological characteristics that evaluate the quality of the surface run-off are listed below.

- *Dissolved Oxygen*. DO in the water has a pronounced effect on the aquatic organisms and the chemical reactions that occur. It is one of the most important biological water quality characteristics in the aquatic environment. The DO concentration of a water body is determined by the solubility of oxygen, which is inversely related to water temperature, pressure, and biological activity. DO is a transient property that can fluctuate rapidly in time and space, and represents the status of the water system at a particular point and time of sampling. The decomposition of organic debris in water is a slow process, as are the resulting changes in oxygen status. The oxygen demand is an indication of the pollutant load and includes measurements of biochemical oxygen demand or chemical oxygen demand.

- *Biochemical Oxygen Demand*. The BOD is an index of the oxygen-demanding properties of the biodegradable material in the water. Samples are taken from the field and incubated in the laboratory at 20°C, after which the residual dissolved oxygen is measured. The BOD value commonly referenced is the standard 5-day values. These values are useful in assessing stream pollution loads and for comparison purposes.

- *Chemical Oxygen Demand*. The COD is a measure of the pollutant loading in terms of complete chemical oxidation using strong oxidizing agents. It can be determined quickly because it does not rely on bacteriological actions as with BOD. COD does not necessarily provide a good index of oxygen demanding properties in natural waters.

- *Total Dissolved Solids*. Total dissolved solids (TDS) concentration is determined by evaporation of a filtered sample to obtain residue whose weight is divided by the sample volume. The TDS of natural waters varies widely. There are several reasons why TDS is an important indicator of water quality. Dissolved solids affect the ionic bonding strength related to other pollutants such as metals in the water. TDS are also a major determinant of aquatic habitat. TDS affects saturation concentration of dissolved oxygen and influences the ability of a water body to assimilate wastes. Eutrophication rates depend on TDS.

- *pH*. The pH of water is the negative log, base 10, of the hydrogen ion (H^+) activity. A pH of 7 is neutral; a pH greater than 7 indicates alkaline water; a pH less than 7 represents acidic water. In natural water, carbon dioxide reactions are some of the most important in establishing pH. The pH at any one time is an indication of the balance of chemical equilibrium in water and affects the availability of certain chemicals or nutrients in water for uptake by plants. The pH of water directly affects fish and other aquatic life; generally, toxic limits are pH values less than 4.8 and greater than 9.2.

- *Alkalinity*. Alkalinity is the opposite of acidity, representing the capacity of water to neutralize acid. Alkalinity is also linked to pH and is caused by the presence of carbonate, bicarbonate, and hydroxide, which are formed when carbon dioxide is dissolved. A high alkalinity is associated with a high pH and excessive solids. Most streams have alkalinities less than 200 milligrams per liter (mg/l). Ranges of alkalinity of 100-200mg/l seem to support well-diversified aquatic life.

- *Specific Conductance*. The specific conductivity of water, or its ability to conduct an electric current, is related to the total dissolved ionic solids. Long term monitoring of project waters can develop a relationship between specific conductivity and TDS. Its measurement is quick and inexpensive and can be used to approximate TDS. Specific conductivities in excess of 2000 microohms per centimeter (µohms/cm) indicate a TDS level too high for most freshwater fish.

- *Turbidity*. The clarity of water is an important indicator of water quality that relates to the alkalinity of photosynthetic light to penetrate. Turbidity is an indicator of the property of water that causes light to become scattered or absorbed. Turbidity is caused by suspended clays and other organic particles. It can be used as an indicator of certain water quality constituents, such as predicting sediment concentrations.

- *Nitrogen*. Sources of nitrogen in storm water are from the additions of organic matter to water bodies or chemical additions. Ammonia and nitrate are important nutrients for the growth of algae and other plants. Excessive nitrogen can lead to eutrophication since nitrification consumes dissolved oxygen in the water. Nitrogen occurs in many forms. Organic nitrogen breaks down into ammonia, which eventually becomes oxidized to nitrate-nitrogen, a form available for plants. High concentrations of nitrate-nitrogen (N/N) in water can stimulate growth of algae and other aquatic plants, but if phosphorus (P) is present, only about 0.30 mg/l of nitrate-nitrogen is needed for algal blooms. Some fish life can be affected when nitrate-nitrogen exceeds 4.2 mg/l. There are a number of ways to measure the various forms of aquatic nitrogen. Typical measurements of nitrogen include Kjeldahl nitrogen (organic nitrogen plus ammonia), ammonia, nitrite plus nitrate, nitrite, and nitrogen in plants. The principal water quality criterion for nitrogen focuses on nitrate and ammonia.

- *Phosphorus*. Phosphorus is an important component of organic matter. In many water bodies, phosphorus is the limiting nutrient that prevents additional biological activity from occurring. The origin of this constituent in urban storm water discharge is generally from fertilizers and other industrial products. Orthophosphate is soluble and is considered to be the only biologically available form of phosphorus. Since phosphorus strongly associates with solid particles and is a significant part of organic material, sediments influence concentration in water and are an important component of the phosphorus cycle in streams. Important methods of measurement include detecting orthophosphate and total phosphorus.

Existing Storm Water Quality Conditions

The existing site lacks any measured data on storm water runoff quality. In the absence of site-specific data, expected storm water quality can be qualitatively discussed by relating typical pollutants to specific land uses.

The San Gabriel River is under the jurisdiction of the Los Angeles Regional water Quality Control Board (RWQCB), which has listed the San Gabriel River and Estuary on the 2010 303(d) list of water quality limited segments (impaired water bodies). The existing site is tributary to and a contributor of pollutants to the impairments within the San Gabriel River and Estuary. Existing pollutants affecting the San Gabriel River and Estuary include copper, dioxin, nickel, oxygen (dissolved), coliform bacteria, and pH.

The Los Angeles RWQCB has set Total Maximum Daily Loads (TMDLs) for Metals and Selenium within the San Gabriel River per Resolution No. R06-014, approved July 13, 2006. As defined in the resolution, a TMDL is the sum of the individual waste load allocations for point sources and load allocations for nonpoint sources and natural background.

Currently, the site consists of vacant disturbed land, with the exception of one residential structure located within the northwestern portion of the site and a private driveway located within the southeastern portion of the project site. According to the Orange County Public Works *Exhibit 7-III – Technical Guidance Document for the Preparation of the Conceptual/Preliminary and/or Project Water Quality Management Plans*, dated May 19, 2011, the existing residential structure is assumed to generate suspended solids, nutrients, pathogens, pesticides, oil, grease, trash, and debris. The private

driveway is assumed to generate all of the general pollutants ranging from suspended solids to toxic organic compounds. The vacant land is also expected to generate suspended soils.

Beneficial Uses

The Water Quality Control Plan (Basin Plan) recognizes and reflects regional differences in existing water quality, the beneficial uses of the region's ground and surface waters, and local water quality conditions and problems. The Santa Ana River Basin Plan identifies beneficial uses for waters within the Santa Ana Region. A beneficial use is one of the various ways that water can be used for the benefit of people and/or wildlife. Although more than one beneficial use may be identified for a given waterbody, the most sensitive use must be protected. The Basin Plan identifies the following beneficial uses for the Nearshore Zone[1] (San Gabriel River to Poppy Street in Corona Del Mar) and the Tidal Prism of San Gabriel River (River Mouth to Marina Drive):

- IND – Industrial Service Supply;
- REC1 – Water Contact Recreation;
- REC2 – Non-contact water recreation;
- COMM – Commercial and Sportfishing;
- WILD – Wildlife Habitat;
- RARE – Rare, threatened, and endangered species;
- MAR – Marine Habitat;
- SHEL – Shellfish Harvesting;
- EST – Estuarine Habitat;
- NAV – Navigation Waters; and
- SPWN – Spawning, Reproduction, and Development.

TSUNAMI, SEICHE, AND MUDFLOW RUN-UP

Tsunami

A tsunami is a seismic sea-wave caused by sea-bottom deformations that are typically associated with a submarine earthquake. They are also generated by landslides, volcanic eruptions, or more rarely by asteroid impact. The California Emergency Management Agency, in cooperation with California Geological Survey, produced a Tsunami Inundation Map for the Seal Beach 7.5" Quadrangle (dated March 15, 2009) that depicts the project site and surrounding neighborhood lying within a tsunami inundation area. As addressed in the latest edition of the Federal Emergency Management Agency's (FEMA) Coastal Construction Manual, a tsunami with a 90 percent probability of not being exceeded in 50 years has the potential run-up elevation at the project site of up to 15 feet mean sea level (msl).

[1] Defined by Ocean Plan Chapter II B-1 "within a zone bounded by shoreline and a distance of 1,000 feet from shoreline or the 30-foot depth contour, whichever is further from the shoreline…", Santa Ana Regional Water Quality Control Board, *Water Quality Control Plan*, updated 2008.

Seiching

Seiching involves an enclosed body of water oscillating due to ground shaking, usually following an earthquake. Lakes and water towers are typical bodies of water affected by seiching. Given that there are no large, enclosed open bodies of water or reservoirs upgradient of the project area, the likelihood of seiche is considered remote.

Mudflows

Mudflows result from the downslope movement of soil and/or rock under the influence of gravity. The project site and surrounding area is relatively flat. Given the character and topography of the project site and surrounding area, the likelihood of mudflow at the project site is considered remote.

5.11.2 REGULATORY SETTING

This section discusses the Federal, State, and local drainage policies and requirements applicable to the project site.

FEDERAL LEVEL

Federal Clean Water Act (Section 404)

The project would be subject to Federal permit requirements under the Federal Clean Water Act (CWA). The CWA requires that the discharge of pollutants to "Waters of the U.S." from any point source be effectively prohibited, unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) Permit. Under the NPDES permit program, the EPA established regulations for discharging storm water by municipal and industrial facilities and construction activities.

The NPDES permit is broken up into two Phases: I and II. Phase I requires medium and large cities, or certain counties with populations of 100,000 or more to obtain NPDES permit coverage for their storm water discharges. Phase II requires regulated small Municipal Separate Storm Sewer Systems (MS4s) in urbanized areas, as well as small MS4s outside the urbanized areas that are designated by the permitting authority, to obtain NPDES permit coverage for their storm water discharges. Polluted storm water run-off is commonly transported through MS4s. This run-off is often untreated and discharged into local water bodies.

National Flood Insurance Program

The National Flood Insurance Program (NFIP) was created by Congress in 1968. It provided a means for property owners to financially protect themselves from flood damage. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the program. Participating communities agree to adopt and enforce ordinances that meet or exceed FEMA requirements to reduce the risk of flooding. The City of Seal Beach is a participating community and must adhere to the NFIP.

STATE LEVEL

California Porter-Cologne Act

The CWA places the primary responsibility for the control of surface water pollution and for planning the development and use of water resources with the states, although it does establish certain guidelines for the states to follow in developing their programs and allows the EPA to withdraw control from states with inadequate implementation mechanisms.

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (Porter-Cologne Act). The Porter-Cologne Act grants the State Water Resources Control Board (SWRCB) and the RWQCBs authority and responsibility to adopt plans and policies, to regulate discharges to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. The Porter-Cologne Act also establishes reporting requirements for unintended discharges of any hazardous substance, sewage, or oil or petroleum product.

Each RWQCB must formulate and adopt a water quality control plan for its region. The regional plans are to conform to the policies set forth in the Porter-Cologne Act and established by the SWRCB in its state water policy. The Porter-Cologne Act also provides that a RWQCB may include within its regional plan water discharge prohibitions applicable to particular conditions, areas, or types of waste.

State Water Resources Control Board

The SWRCB administers water rights, water pollution control, and water quality functions throughout the State, while the RWQCBs conduct planning, permitting, and enforcement activities. For the proposed project, the NPDES permit is divided into two parts: construction and post-construction. The construction permitting is administered by the SWRCB, while the post-construction permitting is administered by the RWQCB.

Development projects typically result in the disturbance of soil that requires compliance with the NPDES General Permit, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activities (Order No. 2009-0009-DWQ, NPDES Number CAS000002). This Statewide General Construction permit regulates discharges from construction sites that disturb one or more acres of soil. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least one acre of total land area must comply with the provisions of this NPDES Permit, and develop and implement an effective Storm Water Pollution Prevention Plan (SWPPP). The project applicant must submit a Notice of Intent (NOI) to the SWRCB, to be covered by the NPDES General Permit, and prepare the SWPPP before beginning construction. Implementation of the plan starts with the commencement of construction and continues through the completion of the project. Upon completion of the project, the applicant must submit a Notice of Termination (NOT) to the SWRCB to indicate that construction is completed.

Santa Ana Regional Water Quality Control Board

The SWRCB oversees the nine RWQCBs in the state of California. The City of Seal Beach is within the jurisdictional boundaries of the Santa Ana RWQCB (Region 8). The NPDES MS4 permit program is administered by the RWQCB, which develops and enforces water quality objectives and implementation plans that safeguard the quality of water resources in its region. Its duties include developing "basic plans" for its hydrologic area, issuing waste discharge requirements, taking enforcement action against violators, and monitoring water quality.

To prevent harmful pollutants from being washed or dumped into Municipal Separate Storm Sewer Systems (MS4s), facilities must comply with the NPDES permit and develop a storm water management program (SWMP). The goal of the SWMP is to reduce the contamination of storm water run-off and prohibit illicit discharges.

Based on the project's location and what water body it drains to, a risk level will be assigned to the project and indicate what level of monitoring will be required. The proposed project would be considered a risk level 1 project, which is the lowest level and would require that minimum BMPs are installed and visual monitoring is conducted.

California Coastal Commission

The California Coastal Commission (CCC) was established by voter initiative in 1972 (Proposition 20) and later made permanent by the Legislature through adoption of the California Coastal Act of 1976. The CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. Development activities, which are broadly defined by the Coastal Act to include (among others) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, generally require a coastal permit from either the CCC or the local government. A Coastal Development Permit (CDP) would be required prior to any construction activities within the project site since it is located within the coastal zone.

Non-Point Source Pollution Control Program

The purpose of the Non-Point Source Pollution (NPS) Control Program (NPS Program Plan) is to improve the State's ability to effectively manage NPS pollution and conform to the requirements of the CWA and the Federal Coastal Zone Act Reauthorization Amendments of 1990. These documents were developed by staff of the SWRCB's Division of Water Quality and the CCC, in coordination with the RWQCBs and staff from over 20 other State agencies.

LOCAL LEVEL

Orange County Public Works

According to the Orange County Watersheds (OC Watersheds), the specific water pollutant control elements of the Orange County Stormwater Program are documented in the *2003 Drainage Area Management Plan* (DAMP). The Orange County Stormwater Program is a municipal regulatory compliance initiative focused on the management and protection of Orange County's streams, rivers, creeks, and coastal waters.

The Orange County DAMP is the Permittees' (County of Orange, the Orange County Flood Control District, and the incorporated cities of Orange County) primary policy, planning, and implementation document for municipal NPDES Stormwater Permit compliance. The focus of the DAMP is addressing the impacts of urban runoff on water quality.

In 2007, a Proposed Orange County DAMP was introduced, but has not been approved. It is currently being updated to adhere to the current municipal NPDES Stormwater Permit (Permit No. CAS618030, Order No. R8-2009-0030, Amended by Orders R8-2010-0062). As part of the DAMP, OC Watersheds has recently produced an updated *Exhibit 7.II - Model Water Quality Management Plan* (Model WQMP), dated May 19, 2011. At this time it is anticipated that the proposed project would be required to follow the May 2011 Model WQMP requirements.

Seal Beach Municipal Code

City of Seal Beach Municipal Code (Municipal Code) Section 10.15.065(B), Compliance with Regional Water Quality Control Board Requirements requires discharges into any groundwater or waterways (whether direct or indirect), public, or private sewer or sewage disposal system, or into the ground, conform with the requirements of the Santa Ana RWQCB, the California Department of Fish and Game, the California Department of Public Health, or such other relevant governmental agency. For this analysis it is assumed the City will defer to the May 2011 Model WQMP for compliance with NPDES.

Local flood control regulations for the City are included in Municipal Code Section 10.15.065(A) (Approved Storm Drain System). It states that the storm drain system shall be designed with adequate capacity to accommodate ultimate development of the drainage area and shall provide for the protection of surrounding properties that would be adversely affected by any increase in runoff attributed to the development.

City of Seal Beach General Plan

City policies pertaining to water quality and flooding are contained in Safety Element of the *City of Seal Beach General Plan* (General Plan). These policies include the following, among others:

- Periodically inspect and maintain all public drainage structures and remind property owners to maintain private drainage structures in order to maximize capacity. (5A)

- Contain and utilize runoff from impervious surfaces onsite to the greatest extent possible. Transmit excess runoff to the nearest street or facility capable of conveying the runoff without impacting downstream areas. (5C)

- Plan capacity for the 100-year flood and provide short term reasonable protection for locations that would benefit from 10-, 25- or 50-year storm drainage facilities. (5D)

- Monitor the effects of inland development on the City's watershed and its management and attempt to minimize their impacts. (5J)

- Continue to participate in the National Flood Insurance Program and utilize the most recent Flood Insurance Rate Maps in the implementation and enforcement of the City's "Floodplain Overlay District" requirements. (5L)

5.11.3 IMPACT THRESHOLDS AND SIGNIFICANCE CRITERIA

CEQA SIGNIFICANCE CRITERIA

Appendix G of the *CEQA Guidelines* contains the Initial Study Environmental Checklist, which includes questions relating to hydrology, drainage and water quality. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant adverse environmental impact if it would:

- Violate any water quality standards or waste discharge requirements (refer to Impact Statements HWQ-1 and HWQ-2);

- Substantially deplete groundwater supplies or substantially interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted) (refer to Section 8.0, *Effects Found Not to be Significant*);

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site (refer to Impact Statement HWQ-2);

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface run-off in a manner that would result in flooding on- or off-site (refer to Impact Statement HWQ-2);

- Create or contribute to run-off water that would exceed the capacity of existing or planned storm water drainage systems or provision of substantial additional sources of polluted run-off (refer to Impact Statement HWQ-2);

- Otherwise substantially degrade water quality (refer to Impact Statements HWQ-1 and HWQ-2);

- Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map (refer to Section 8.0, *Effects Found Not to be Significant*);

- Place a structure within a 100-year flood hazard area that would impede or redirect flood flows (refer to Section 8.0, *Effects Found Not to be Significant*);

- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam (refer to Section 8.0, *Effects Found Not to be Significant*);

- Result in inundation by seiche, tsunami, or mudflow (refer to Impact Statement HWQ-3);

- Potential impact of storm water runoff from construction activities (refer to Impact Statement HWQ-1);

- Result in a potential for discharge of storm water pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks or other outdoor work areas (refer to Impact Statement HWQ-1 and HWQ-2);

- Result in the potential for discharge of storm water to affect the beneficial uses of the receiving waters (refer to Impact Statement HWQ-1 and HWQ-2);

- Create the potential for significant changes in the flow velocity for volume of storm water runoff to cause environmental harm (refer to Impact Statement HWQ- 2); and/or

- Create significant increases in erosion of the project site or surrounding areas (refer to Impact Statement HWQ-1).

5.11.4 IMPACTS AND MITIGATION MEASURES

WATER QUALITY – SHORT-TERM IMPACTS

HWQ-1 GRADING, EXCAVATION, AND CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE PROPOSED PROJECT COULD IMPACT WATER QUALITY.

Impact Analysis: There are three sources of short-term construction-related storm water pollution associated with the proposed project, which include the following:

- Handling, storage, and disposal of construction materials containing pollutants;
- Maintenance and operation of construction equipment; and
- Earthmoving activities.

These sources, if not controlled, can generate soil erosion and on- and off-site transport via storm run-off or mechanical equipment. Poorly maintained vehicles and heavy equipment leaking fuel, oil, antifreeze, or other vehicle-related fluids on the project site are also common sources of storm water pollution and soil contamination. Generally, standard safety precautions for handling and storing construction materials can adequately reduce the potential pollution of storm water by these materials. These types of standard procedures can be extended to non-hazardous storm water pollutants such as sawdust, concrete washout, and other wastes.

In addition, grading activities can greatly increase erosion processes, leading to impacts on storm drains and sediment loading to storm run-off flows. Two general strategies are recommended to prevent soil materials from entering local storm drains. First, erosion control procedures should be implemented for those areas that must be exposed, and secondly, the project site should be secured to control off-site transport of pollutants.

In order to reduce the amount of on-site exposed soil, graded areas would be protected against erosion once they are brought to final grade through the implementation of Best Management Practices (i.e., hydraulic mulching, hydroseeding, soil binders, etc.). Furthermore, the project would be required to prepare and submit a Notice of Intent (Mitigation Measure HWQ-1) and a SWPPP (Mitigation Measure HWQ-2) to the SWRCB demonstrating compliance with the Construction General NPDES Permit. Construction activities for the proposed project would be subject to inspection by the City Department of Public Works. The General Permit requires that non-storm water discharges from construction sites be eliminated or reduced to the maximum extent practicable, that a SWPPP be developed governing construction activities for the proposed project, and that routine inspections be performed of all storm water pollution prevention measures and control practices being used at the site, including inspections before and after storm events. The Hydrology Study identifies potential BMPs that may be outlined in the project's SWPPP, required as part of Mitigation Measure HWQ-3. These BMPs include, but are not limited to, minimizing the removal of trees, hydraulic mulching, hydroseeding, silt fencing, sediment trapping, and construction road stabilization. Upon completion of the project, the applicant would be required to submit a Notice of Termination to the SWRCB (Mitigation Measure HWQ-4) to indicate that construction is completed.

Construction activities associated with the proposed project would have a less than significant impact on surface water quality and would not significantly impact the beneficial uses of receiving waters with compliance with Mitigation Measures HWQ-1 through HWQ-4, which would ensure adherence to construction requirements per the State. With implementation of Mitigation Measures HWQ-1 through HWQ-4, short-term water quality impacts would be reduced to less than significant levels.

Mitigation Measures:

HWQ-1 Prior to Grading Permit issuance and as part of the project's compliance with the NPDES requirements, a Notice of Intent (NOI) shall be prepared and submitted to the State Water Resources Quality Control Board (SWRCB), providing notification and intent to comply with the State of California General Permit.

HWQ-2 The proposed project shall conform to the requirements of an approved Storm Water Pollution Prevention Plan (SWPPP) (to be applied for during the Grading Plan process) and the NPDES Permit for General Construction Activities No. CAS000002, Order No, 2009-0009-DWQ, including implementation of all recommended Best Management Practices (BMPs), as approved by the State Water Resources Quality Control Board (SWRCB).

HWQ-3 The range of Best Management Practices (BMPs) outlined in Section 5.0 of the *Department of Water and Power Specific Plan Amendment Environmental Impact Report Hydrology and Water Quality Technical Appendix* (Hydrology Study), prepared by RBF Consulting,

(November 2011), and/or equivalent and related provisions shall be incorporated into the project's Storm Water Pollution Prevention Plan (SWPPP). The Hydrology Study is included in Appendix 11.10, *Hydrology and Water Quality Technical Study* of this EIR and is incorporated by reference into this mitigation measure.

HWQ-4 Upon completion of project construction, the project applicant shall submit a Notice of Termination (NOT) to the State Water Resources Quality Control Board (SWRCB) to indicate that construction is completed.

Level of Significance: Less Than Significant With Mitigation Incorporated.

LONG-TERM OPERATIONAL IMPACTS

HWQ-2 IMPLEMENTATION OF THE PROPOSED PROJECT COULD POTENTIALLY RESULT IN INCREASED RUN-OFF AMOUNTS AND DEGRADED WATER QUALITY.

Impact Analysis: This section analyzes the proposed project conditions and compares them to the existing conditions to determine resultant impacts on drainage, run-off, and water quality.

Proposed Land Use

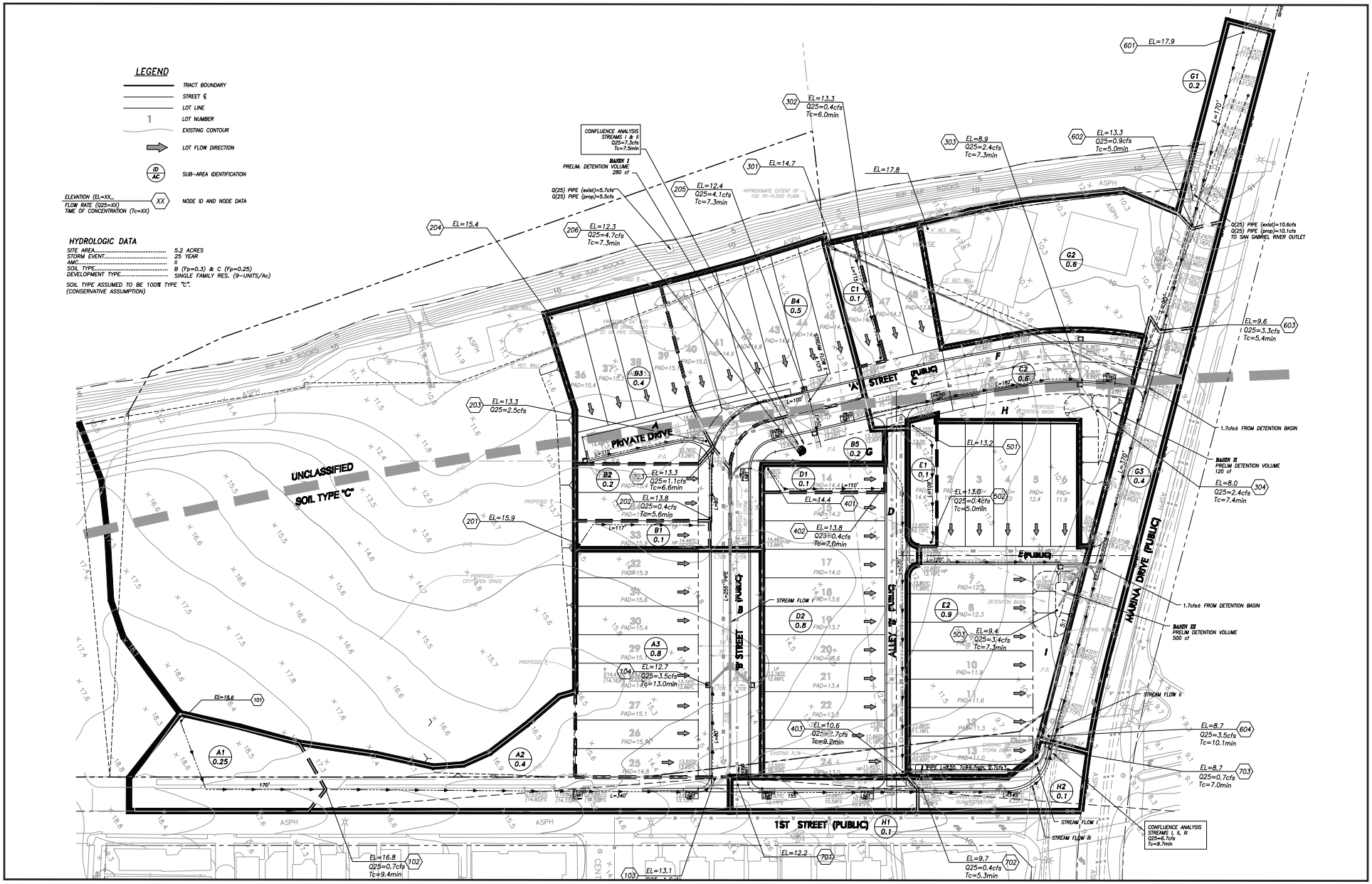
The project would allow for the development of a 48-lot residential development located on approximately 4.5 acres in the northern portion of the project site and open space/passive recreation uses on the remaining approximately 6.4 acres of the project site. As proposed, the project would involve finished pads and all infrastructure necessary to serve the new residential development. The residential units would be developed individually by homeowners as custom homes. The southern portion of the project site would be maintained as open space for the future development of open space/passive park uses. Proposed park uses would include, but not be limited to, natural areas with trails, passive turf areas, and neighborhood-serving play areas (e.g., tot lots).

Proposed Storm Water Drainage

Table 5.11-2, *Comparison of 2-Year and 25-Year Hydrology (Northern Site)*, provides a comparison of existing and proposed project peak flow rates for the 2-year and 25-year storm events.

As indicated in Table 5.11-2, the increase in imperviousness associated with implementation of Tentative Tract Map No. 17425 would increase peak flow rates in both the 2-year and 25-year storm events at the Marina Drive storm drain and San Gabriel River outlet structure above existing conditions. The increase in peak flow rates is considered a significant impact unless mitigated.

As a result of the increased flow rates, measures would be required to reduce the proposed project flow rates to equal to or less than existing conditions. Therefore, in order to mitigate the impact associated with the increase in peak flow rates for the 2-year and 25-year storm events, the project proposes three detention facilities within the northern portion of the site; one would outlet directly to the San Gabriel River and two would outlet to the Marina Drive storm drain (Mitigation Measure HWQ-5); refer to Exhibit 5.11-2, *Proposed Conditions Hydrology*.



Source: Fuscoe Engineering.

NOT TO SCALE

RBF CONSULTING

11/11 • JN 10-107353

ENVIRONMENTAL IMPACT REPORT
DEPARTMENT OF WATER AND POWER SPECIFIC PLAN AMENDMENT

Proposed Conditions Hydrology

Exhibit 5.11-2

Table 5.11-2
Comparison of 2-Year and 25-Year Hydrology (Northern Site)

Tributary To:	Area (acres)			Flow (cfs)			Volume (acre-feet)[1]		
	Existing	Project	Change	Existing	Project	Change	Existing	Project	Change
2-Year Flowrates									
Marina Drive Storm Drain	4.4	4.0	-0.4	4.5	5.5	1.0	--	--	--
San Gabriel River	2.4	2.9	0.5	3.1	3.2	0.1	--	--	--
Total	6.8	6.9	0.1	7.6	8.7	1.1	0.18	0.31	0.13
25-Year Flowrates									
Marina Drive Storm Drain	4.4	4.0	-0.4	10.6	12.5	1.9	--	--	--
San Gabriel River	2.4	2.9	0.5	6.3	7.3	1.0	--	--	--
Total	6.8	6.9	0.1	16.9	19.8	2.9	--	--	--

cfs = cubic feet per second

Note:
1. 2-year volumes are required for the WQMP.

Source: RBF Consulting, *Department of Water and Power Specific Plan Amendment Environmental Impact Report Hydrology and Water Quality Technical Appendix*, November 2011.

Table 5.11-3, *Mitigated 2-Year and 25-Year Hydrology Comparison (Northern Site)*, provides a comparison of the peak flow rates for the existing and proposed project with the detention facilities for the 2-year and 25-year storm events.

Table 5.11-3
Mitigated 2-Year and 25-Year Hydrology Comparison (Northern Site)

Tributary To:	Area (acres)			Flow (cfs)			Volume (acre-feet)[1]		
	Existing	Project With Mitigation	Change	Existing	Project With Mitigation	Change	Existing	Project With Mitigation	Change
2-Year Flowrates									
Marina Drive Storm Drain	4.4	4.0	-0.4	4.4	4.3	-0.1	--	--	--
San Gabriel River	2.4	2.9	0.5	2.3	2.3	0.0	--	--	--
Total	6.8	6.9	0.1	6.7	6.6	-0.1	0.18	0.31	0.13
25-Year Flowrates									
Marina Drive Storm Drain	4.4	4.0	-0.4	10.5	10.1	-0.4	--	--	--
San Gabriel River	2.4	2.9	0.5	5.7	5.5	-0.2	--	--	--
Total	6.8	6.9	0.1	16.2	15.6	-0.6	--	--	--

cfs = cubic feet per second

Notes:
1. 2-year volumes are required for the WQMP.

Source: RBF Consulting, *Department of Water and Power Specific Plan Amendment Environmental Impact Report Hydrology and Water Quality Technical Appendix*, November 2011.

As indicated in Table 5.11-3, with implementation of the detention facilities, runoff during the 2-year and 25-year storm events associated with the proposed project would be less than or equal to existing conditions. No additional mitigation of the 2-year and 25-year storm events would be required, and impacts would be less than significant in this regard. However, verification that no adverse flooding impacts would occur at the intersection of Marina Drive and 1st Street during the 100-year storm event would be required (Mitigation Measure HWQ-6). Compliance with Mitigation Measure HWQ-6 would ensure that any adverse impacts associated with the 100-year storm event would be mitigated to a less than significant level.

The incorporation of additional on-site retention to limit runoff volumes to pre-project conditions is constrained by several factors. Infiltration is not feasible due to poor percolating soils and high groundwater. Water reuse demands based on the on-site irrigation demand is not sufficient to utilize the retention volumes within a timely manner as required by the Model WQMP. Additionally, hydromodification impacts would not be significant since the San Gabriel River is tidally influenced and an engineered, hardened, and maintained channel.

As stated, the southern portion of the project site would be maintained as open space for the future development of open space/passive park uses. Proposed park uses would include, but not be limited to, natural areas with trails, passive turf areas, and neighborhood-serving play areas (e.g., tot lots). As indicated in Table 5.11-4, *Comparison of Tributary Areas (Southern Site)*, the southern portion of the project area would have minimal change to the tributary area, thus no hydrology and drainage impacts would occur and no mitigation would be required. Impacts would be less than significant in this regard.

Table 5.11-4
Comparison of Tributary Area (Southern Site)

Tributary To:	Area (acres)		
	Existing	Project	Change
San Gabriel River	6.5	6.4	-0.1

Source: RBF Consulting, *Department of Water and Power Specific Plan Amendment Environmental Impact Report Hydrology and Water Quality Technical Appendix*, November 2011.

Storm Water Quality

The project would allow for the development of 48 residential dwelling units within the northern portion of the project site. The project site would experience increased pollutant generation due to the number of detached residential lots increasing from one to 48, which would potentially increase the generation of suspended solids/sediments, nutrients, pathogens, pesticides, oil and grease, and trash and debris. Due to the fact that the San Gabriel River is listed on the 303D list, for copper, dioxin, nickel, dissolved oxygen, coliform bacteria, and pH, and has a TMDL for metals and selenium, the future residential development could have a significant adverse impact to storm water quality if not mitigated.

The SWRCB Municipal NPDES Storm Water Permit for the County of Orange and the Incorporated Cities of Orange County requires applicants to prepare a WQMP to manage post-construction storm water runoff associated with development. The proposed project is considered a "Priority Project" in accordance with the 2011 Countywide Model WQMP, as it represents a "New development projects that create 10,000 square feet or more of impervious surface." A Preliminary Water Quality Management Plan (PWQMP) has been prepared for Tentative Tract Map 17425; refer to Appendix 11.10. The PWQMP describes the development and its operations, identifies potential sources of storm water pollution, and recommends appropriate Best Management Practices (BMPs) or pollution control measures to reduce the discharge of pollutants in storm water runoff. Recommended BMPs include site design, source control, and low impact development; refer to Section 4.0 of the PWQMP (included as Appendix 11.10) for a complete list of BMPs. The Final WQMP, approved by the City, would provide the final BMPs applicable to the proposed project (Mitigation Measure HWQ-7). Implementation of the Final WQMP would ensure that post-construction water quality impacts, including impacts to beneficial uses of receiving waters, associated with Tentative Tract Map 17425 and future residential development would be reduced to the Maximum Extent Practicable (MEP). Post-construction water quality impacts within the northern portion of the project site would be reduced to a less than significant level.

The southern portion of the project site would involve open space/passive park and existing private driveway. It is assumed the private driveway would continue to generate general pollutants, such as suspended solids/sediments, nutrients, heavy metals, pathogens, pesticides, oil and grease, toxic organic compounds, and trash and debris. The City would be required to prepare a WQMP to address post-construction operations associated with future development of the passive park (Mitigation Measure HWQ-8). Compliance with the WQMP would reduce potential water quality impacts associated with the passive park to a less than significant level.

Mitigation Measures:

HWQ-5 Prior to issuance of a grading permit for Tentative Tract Map 17425, the project applicant shall provide detailed basin sizing calculations and design drawings demonstrating the detention basins adequately mitigate the 2-year and 25-year storm events, consistent with the hydrology analysis provided in Section 5.0 of the *Department of Water and Power Specific Plan Amendment Environmental Impact Report Hydrology and Water Quality Technical Appendix* (Hydrology Study), prepared by RBF Consulting, (November 2011). The Hydrology Study is included in Appendix 11.10, *Hydrology and Water Quality Technical Study* of this EIR and is incorporated by reference into this mitigation measure.

HWQ-6 In conjunction with final project design and when precise engineering occurs, the project applicant shall demonstrate no adverse flooding impacts would occur at the intersection of Marina Drive and 1st Street during the 100-year storm event. The analysis shall be submitted to the City Engineer prior to recordation of the Final Tentative Tract Map 17425 and prior to issuance of the grading permit.

HWQ-7 Prior to issuance of a grading permit for Tentative Tract Map 17425, the project applicant shall submit a Final Water Quality Management Plan for approval by the City Engineer that complies with the requirements of the latest Orange County Public Works Drainage Area Management Plan.

HWQ-8 Prior to initiation of grading activities for the open space/passive park, the City shall prepare a Water Quality Management Plan for approval by the City Engineer that complies with the requirements of the latest Orange County Public Works Drainage Area Management Plan.

Level of Significance: Less Than Significant With Mitigation Incorporated.

SEICHE, TSUNAMI, OR MUDFLOW

HWQ-3 THE PROPOSED PROJECT COULD POTENTIALLY BE INUNDATED BY SEICHES, TSUNAMIS, OR MUDFLOWS.

Impact Analysis: As stated, the project site is not located near an enclosed water body or reservoir and the potential for a seiche that would impact the project site is considered remote. Additionally, the project site and surrounding area are relatively flat and the project site is not located downslope from an area of potential mudflow. Thus, less than significant impacts would occur in this regard.

As indicated in the latest edition of FEMA's Coastal Construction Manual, a tsunami with a 90 percent probability of not being exceeded in 50 years has the potential run-up elevation at the project site of up to 15 feet msl. Existing ground surface elevations within the residential portion of the proposed project are between 10 to 15 feet msl. Thus, the potential hazard from tsunamis run-up is considered significant, which is consistent with many coastal areas.

The City's *Emergency Operations Plan* (EOP) was updated in September of 2005 and details the City's specific responsibilities before, during, and after any emergency, including potential tsunamis. The EOP is in compliance with the State Emergency Services Plan. Although typical emergencies generally occur without advance warning, and therefore require prompt mobilization and commitment of the emergency organization after the onset of the emergency, warning systems and evacuation plans would minimize hazards associated with tsunamis. Timely warning and information broadcasts provide the ability for residents to prepare for evacuation. According to Figure S-15, *Impaired Road Access Map*, of the General Plan, the project site and vicinity are not located within an impaired road access area. During an evacuation, persons in proximity to the project site can utilize Marina Drive, 1st Street, and Ocean Avenue.

During or following local emergencies, the City is the first agency involved. If the emergency is so large that the City's resources are inadequate or exhausted, assistance would be requested of, and provided by, nearby jurisdictions through mutual aid agreements. Neighborhood groups can assist the City by conducting first aid and search and rescue operations in times of large disasters. When mutual aid systems are not sufficient for the disaster task, the County requests assistance from the State. The Governor's Office of Emergency Services (OES) coordinates regional emergency response and disaster assistance. The State may also request aid from the Federal government in the form of a Presidential Disaster Declaration. FEMA then provides disaster assistance, temporary housing assistance, and recovery funds after a Presidential Disaster Declaration.

Upon implementation of the City's EOP, potential impacts associated with the inundation by a tsunami would be reduced to less than significant levels.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

5.11.5 CUMULATIVE IMPACTS

The basis for cumulative analysis is presented in Section 4.0, *Basis of Cumulative Analysis*. Cumulative projects identified as having the potential to interact with the proposed project to the extent that a significant cumulative effect could occur include the:

- Fresh 'n Easy Project;
- Marina Park Development;
- River's End Staging Area and San Gabriel River Bikeway Enhancement Plan; and
- 2nd Street and Pacific Coast Highway Project.

The following discussions are included per topic area to determine whether a significant cumulative effect would occur.

- **GRADING, EXCAVATION, AND CONSTRUCTION ACTIVITIES ASSOCIATED WITH THE PROPOSED PROJECT AND OTHER RELATED CUMULATIVE PROJECTS COULD POTENTIALLY IMPACT WATER QUALITY.**

- **IMPLEMENTATION OF THE PROPOSED PROJECT AND OTHER RELATED CUMULATIVE PROJECTS COULD POTENTIALLY RESULT IN INCREASED RUN-OFF AMOUNTS AND DEGRADED WATER QUALITY.**

Impact Analysis: Cumulative projects would have the potential to affect water quality during construction and long-term operation. The projects would contribute storm water flows to the local and regional drainage facilities. However, construction activities associated with cumulative projects would have a less than significant impact on surface water quality with adherence to State-required construction requirements. Each project would also be required to comply with existing water quality standards, and include BMPs as necessary. Therefore, overall cumulative impacts would be less than significant.

Development of the proposed project, along with related cumulative projects, would result in increased potential for short-term construction and long-term operational water quality impacts within the area. However, the proposed project would adhere to NPDES requirements and implement a SWPPP with specific BMPs, as required by Mitigation Measures HWQ-1 through HWQ-4 during construction activities. Additionally, Mitigation Measures HWQ-7 and HWQ-8 would require the preparation of a project-specific WQMP, which would further reduce operational water quality impacts as a result of the proposed project. Therefore, the project impacts would not be cumulatively considerable, and impacts in this regard are less than significant.

Cumulative projects would have the potential to affect hydrology and drainage of the area. The projects would contribute storm water flows to the local and regional storm water system and drainage facilities. However, each individual project would be required to submit individual analyses to the respective City for review and approval prior to issuance of grading or building permits. Each analysis must illustrate how peak flows generated from each related project site would be

accommodated by the City's existing and/or proposed storm drainage facilities. Future projects would also be required to comply with existing water quality standards, implement site-specific improvements, and include BMPs as necessary. Therefore, overall cumulative impacts would be less than significant.

Implementation of the proposed project, in conjunction with related cumulative projects, would result in increased potential for hydrology and drainage impacts within the City. However, although the project would alter drainage patterns and increase the flow rate of run-off exiting the project site, the project includes detention basins which would be designed so that the project would not increase run-off above existing conditions. Therefore, the project impacts would not be cumulatively considerable, and impacts in this regard are less than significant.

Mitigation Measures: Refer to Mitigation Measures HWQ-1 through HWQ-8.

Level of Significance: Less Than Significant With Mitigation Incorporated.

- **THE PROPOSED PROJECT COULD POTENTIALLY BE INUNDATED BY SEICHES, TSUNAMIS, OR MUDFLOWS.**

Impact Analysis: The cumulative projects, as well as the proposed project, could potentially experience tsunami run-up associated with seismic activity due to their proximity to the coast. Seal Beach and Long Beach have adopted Emergency Operations Plans that would be implemented in the event of an emergency, including tsunamis. Warning systems and evacuation plans would minimize hazards associated with tsunamis. In the event of an emergency, patrons of individual development projects would utilize the roadways closest to the site for evacuation. Although there is the potential for evacuation of the project site and cumulative projects to occur simultaneously, implementation of the City's Emergency Operations Plans would facilitate emergency evacuation of the area. According to Figure S-15, *Impaired Road Access Map*, of the General Plan, the project site and vicinity are not located within an impaired road access area. During an evacuation, persons in proximity to the project site can utilize Marina Drive, 1st Street, and Ocean Avenue. Therefore, the project would not contribute to cumulative impacts and impacts in this regard are not cumulatively considerable.

Mitigation Measures: No mitigation measures are required.

Level of Significance: Less Than Significant Impact.

5.11.6 SIGNIFICANT UNAVOIDABLE IMPACTS

No unavoidable significant impacts related to hydrology and water quality have been identified following implementation of the recommended mitigation measures.

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